CRES®
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT

SPRING 1996

Making the CRES "Wish List" Come True

Would you like to give a gift that lasts more than a lifetime? Generous donors have turned the dreams of numerous special research projects into realities. Just ask the research scientists at the Center for Reproduction of Endangered Species (CRES) where work has continued for 20 years to stem the tide of extinction for vanishing wildlife. They have some remarkable achievements to their credit: condor recovery, cheetah breeding, panda and gorilla paternity studies, designing strategies for monitor survival in the wild, rhino reproduction, and identifying viral infections in koalas. But the need goes on—for a diversity of items that current budgets simply do not cover.

State-of-the-art technologies, when applied to wildlife research, will link the high-tech lab with field biologists' efforts to save species like pandas and gorillas in their habitat.

From its beginnings in 1975, CRES has consistently endeavored to keep abreast of new technologies relevant to its pro-

Continued on page 2

CRES® is operated by the Zoological Society of San Diego.

Inside CRES
Reproduction studies for pygmy lorises. See page 4.

Estate Planning
A wide variety of giving techniques. See page 5.

Cans for Critters
Recycling to help CRES. See page 6.

Making the CRES "Wish List" Come True

Continued from page 1

grams and disciplines and to incorporate many of these new methods into the scientific efforts of its various divisions. Many of these procedures, as well as established and routine biotechnologies used at CRES, require specialized—and often expensive—highly complex and sophisticated scientific instruments and equipment.

Over the years, we have been fortunate to have received support from the Zoological Society of San Diego for the purchase of many required equipment items. But in years of economic downturn, such purchases have been limited.

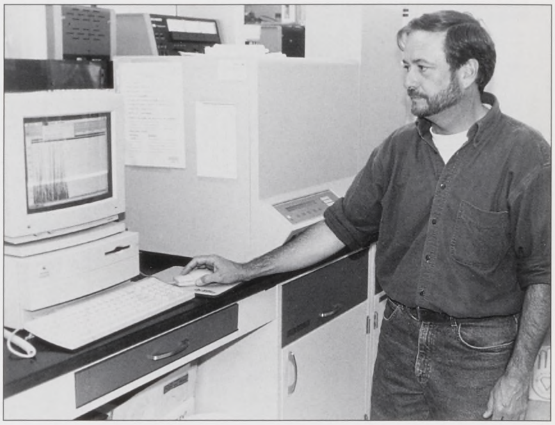
But the need goes on—for a diversity of items that current budgets simply do not cover.

Often an urgent need for a new scientific apparatus may occur late in the year, after the capital item budget has been expended. In such cases important research work might have been delayed or hampered without the needed items. It is in these instances that special friends of CRES—including private individuals, corporations, and foundations—have provided great help through donated funds to enable the purchase of these items.

In 1995, several items of computer hardware and software were obtained by four CRES divisions, including behavior, comparative physiology, cytogenetics, and CRES administration. These purchases were made possible by the donations of several contributors. Computers have become essential to every aspect of zoo operations and functions, especially the scientific research efforts at CRES. Word processing, data storage, analysis and presentation, networking, calculations, and acquisition and storage of information are just some of the many applications for which computers have become indispensable in CRES operations.

A Zeiss inverted microscope, complete with photomicrography optical package, has been obtained by the infectious diseases division with funds provided by two private donations. This instrument is used to monitor and document the appearance of cell cultures used for virus propagation, diagnostic testing, virus characterization, and other experimental laboratory procedures.

A DNA sequencer was recently contributed by the Applied Biosystems Division of the Perkin-Elmer Corporation. This automated apparatus is very valuable for sequencing the nucleotide "building blocks" of DNA, greatly shortening the time and increasing the efficiency for performing these analyses in comparison to doing them manually. This information is especially useful in the genetics division, in determining paternity, identity, and other relationships in species such as giant pandas, gorillas, rhinos, and zebras.



CRES is the first zoo research team with its own automated DNA sequencer, a major donation by scientific instrument manufacturer Perkin-Elmer. Dr. Oliver Ryder (above), head of the CRES genetics division, observes that "This is the age of the DNA sequence. There is so much waiting to be discovered about wildlife from DNA that will help save animals, species, and habitat."

Understanding the genetic diversity of small populations is critical for determining management protocols for endangered species, which will now be made easier by a recent donation of an oligonucleotide synthesizer by Beckman Instruments, Inc. This machine allows several divisions to rapidly produce oligonucleotide primers for use in PCR and DNA sequencing for species such as koalas, cheetahs, condors, and giant pandas.

Every piece of equipment listed on the CRES "Wish List" is essential to some project. As with all scientific endeavors, financial assistance is an ongoing need. At CRES, the staff knows that wishes do come true with support from friends whose gifts will help to keep many endangered species from vanishing forever.

—Werner P. Heuschele, D.V.M., Ph.D., CRES Director

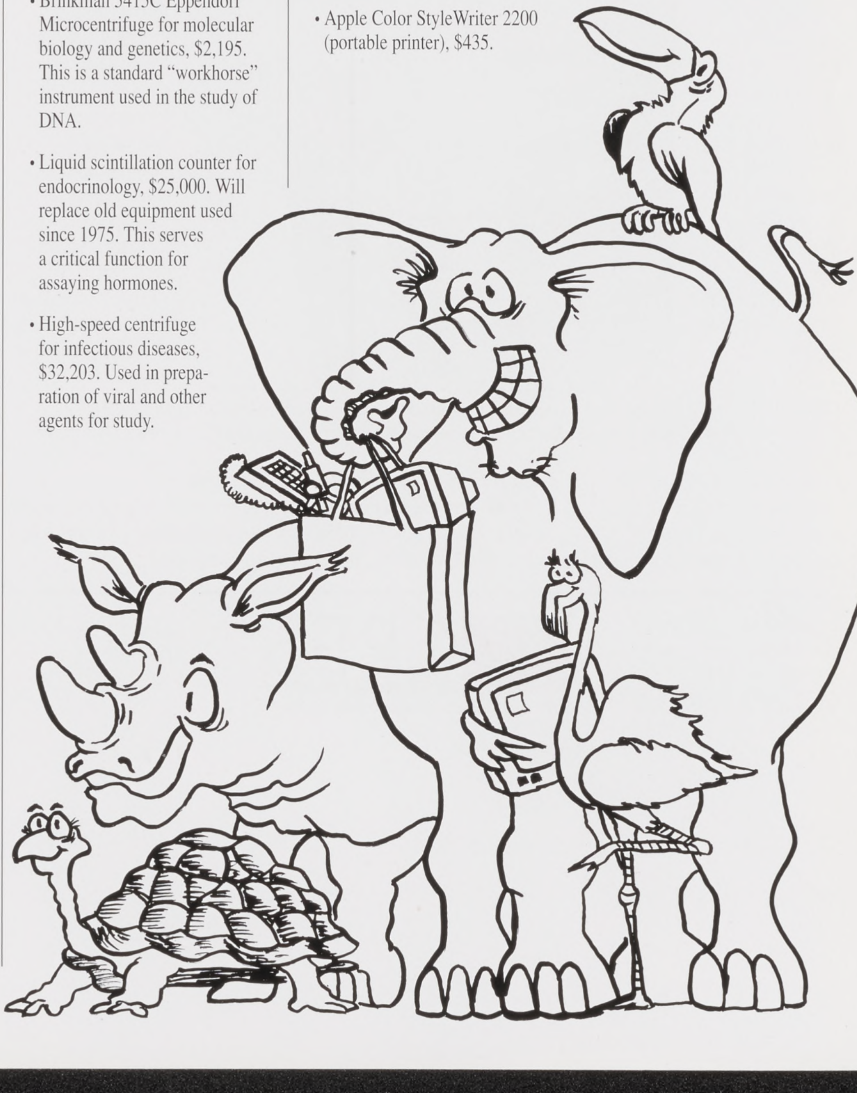
1996 CRES "Wish List"

As long as there are animals on our Earth, there will be a need for research projects to ensure their survival. Financial assistance is an ongoing need for the acquisition of the very special equipment and supplies required by CRES staff, which include:

- Teaching head for lab microscope for pathology, $2,675. Multiple eyepiece viewers permitting two or more persons to view slide at the same time.
- Microscope for endocrinology, $20,000. Will be used to examine embryos of various species, especially reptilians.
- Power Macintosh 7100 computer for virology/immunology, $4,780. Will enable all staff in this division to have simultaneous access to a computer.
- Nikon Optiphot photomicroscope for cytogenetics, $16,050. Will expand the ability to conduct cytogenetic (chromosome) studies.
- Ultralow freezer with inventory rack system for veterinary services and pathology, $10,850. Will be used for frozen storage of biologic specimens.
- CRES administration needs a new, small utility vehicle to replace an aging Yamaha golf cart for transporting personnel around the Zoo.
- Macintosh 6115 CD Performa computer for behavior, $2,857.
- Biological safety hood class II/B3 forma for infectious diseases, $7,315. Will provide necessary safe workstation for handling live infectious agents.
- DNA and protein sequence program for virology/immunology and infectious diseases, $3,110. Computer software required to run other instruments performing DNA and protein analysis.
- Cytospin 3 Cytofuge for pathology, $5,376. Used to prepare cells obtained from body fluids for microscopic examination.
- Brinkman 5415C Eppendorf Microcentrifuge for molecular biology and genetics, $2,195. This is a standard "workhorse" instrument used in the study of DNA.
- Liquid scintillation counter for endocrinology, $25,000. Will replace old equipment used since 1975. This serves a critical function for assaying hormones.
- High-speed centrifuge for infectious diseases, $32,203. Used in preparation of viral and other agents for study.
- Computer for clinical laboratory for pathology, $4,280. Used for clinical pathology data storage, analysis, and processing.
- Sound analysis system for behavior, $15,500. Used in studies to analyze vocalizations of a variety of animal species, including birds and mammals.

CRES also needs several less expensive items:

- Apple Color StyleWriter 2200 (portable printer), $435.
- APC Smart-UPS SU700 (or equivalent), backup power supply for Macintosh workstation, $520.
- Bio-Rad GelAir system for preserving experimental results, $765.
- Costar 12-channel pipetter, $570.



Behavior

Pygmy lorises are severely threatened in the wild and intensive management is needed to assure survival in the wild and in captivity. Since the first captive births took place in North America in 1988, the average infant survival rate has been less than 50 percent. Researchers at CRES have undertaken a variety of research projects to address the low reproductive rates and high infant mortality. These efforts have resulted in a high degree of success. Detection of ovulation and pregnancy is achieved through hormonal evaluation of females through analysis of fecal samples. Pygmy lorises show seasonal breeding patterns, and births occur in early spring after a six-month gestation. Results from experiments with various pairing methods indicate that mate choice is more important than pairing duration in influencing pregnancy rates. Pygmy lorises often have twins and may accept unrelated infants. Researchers experimentally introduced an orphan pygmy loris infant to a new mother and her infant. The mother immediately accepted the second infant and it eventually nursed from her along with her own baby. This method of cross-fostering could be a significant factor in promoting normal social development in orphan infants.

Comparative Physiology

Komodo dragons, the largest living lizards, can weigh more than 200 pounds as adults, but the wild population is now listed at only about 5,000 animals. In 1994, the Zoological Society of San Diego's reptile department received six juvenile Komodo dragons on loan from the Cincinnati Zoo. Until they are old enough to be moved to the Wild Animal Park, they are being housed at the CRES Lizard Research Facility for behavioral and physiological studies. To date, sexing young Komodo dragons has been very difficult to accomplish and cannot be done accurately before several years of age. However, researchers in comparative physiology, working together with the Zoological Society's veterinary services staff, have recently developed a new technique for sexing juvenile dragons that appears to be reliable at as early as two years of age. Using hormone assays, in which blood samples are analyzed in the laboratory, we have found that young male dragons have circulating testosterone levels that are ten times higher than those observed in young females. Our hormonal results have been confirmed using the noninvasive technique of ultrasound. Ultrasound examinations on young dragons have revealed the presence of egg follicles in the developing ovaries of juvenile females. No testicular structures are evident in the juvenile males as yet. With these techniques, we have confirmed that the Zoological Society's group consists of four females and two males, an ideal sex ratio for the reptile department's future captive-breeding program for these endangered lizards.

CRES Grants

The Center for Reproduction of Endangered Species is grateful to the following for their support of imperiled wildlife:

*The **Armstrong McDonald Foundation** has made a generous grant toward a study of canid reproductive physiology under the direction of Dr. Barbara Durrant.*

*The **Norcross Wildlife Foundation** is providing funds for the purchase of an ultracold freezer for the Giant Panda Conservation Program.*

*Grants from the **McGrath Family Foundation** and the **Foundation for Endangered Animals** were recently given to the CRES Endowment Fund.*

*Computer equipment and software for CRES will be purchased through the assistance of the **Guerin Foundation** and the **Hollis Foundation**.*

*An oligonucleotide synthesizer is generously being donated by **Beckman Instruments, Inc.** for use in DNA sequencing and polymerase chain reaction (PCR).*

*And special thanks to **Applied Biosystems**, a subsidiary of the **Perkin-Elmer Corporation**, for their donation of a DNA sequencer for the CRES genetics division.*

You Can Be A Major Donor

By using tax-advantaged planned giving techniques, you can significantly aid CRES in meeting its goals and secure many worthwhile benefits for yourself in the process. Here is a spectrum of choices that can provide many mutual advantages.

LIFE INCOME PLANS

A Charitable Remainder Trust is formidable sounding, perhaps, but simple in concept. By irrevocably transferring cash, securities, or real estate into a C.R.T., you can receive lifetime earnings checks. In addition, there are many tax advantages such as immediate charitable gift income tax deductions, avoidance of capital gains taxes from the sale of appreciated property, and possible reduction or elimination of estate taxes. If you do not want to set up your own C.R.T., you can utilize the Zoological Society's Pooled Income Fund, which provides essentially the same advantages as a personal trust but is as simple as opening a bank account.

LIFE INSURANCE

A very impressive future gift to CRES can be created through life insurance. Premiums paid are deductible if the Society owns the policy, which further reduces the already modest present cost of such a gift arrangement.

SECURITIES

Many types of securities, especially if highly appreciated, can make wonderful charitable gifts. You may deduct the full market value on the date of the gift, not just your basis cost, and thereby make a substantial immediate gift at a very low actual cost.

REAL ESTATE

Real property of many types can make great gifts with a low basis cost. And real estate can be transferred into charitable trusts to provide you lifetime income and tax advantages.

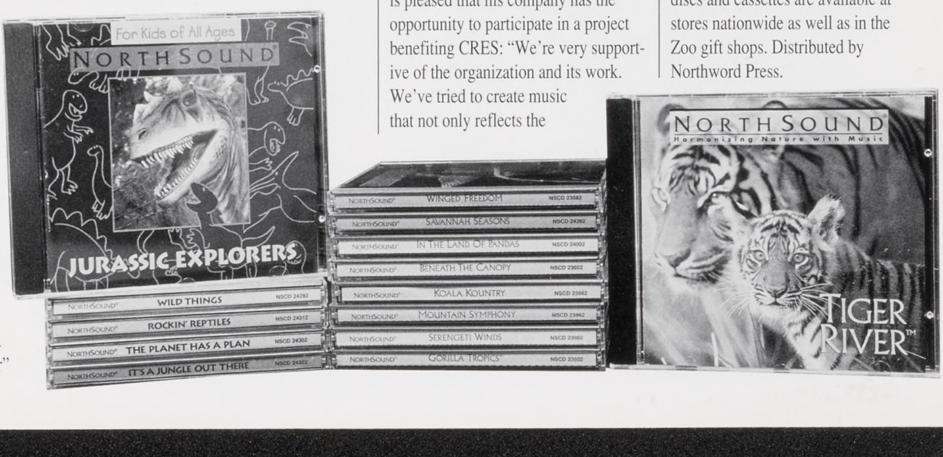
I.R.A.

You can make the Society the primary or contingent beneficiary of your I.R.A. and, thereby, arrange a fine future gift to CRES with no actual additional cost above your planned I.R.A. contributions.

Brochures or other information regarding these giving opportunities are yours for the asking. Just phone Patrick O'Reiley, the Society's planned giving director, at (619) 685-3215 and you will receive a prompt response.

Network Music: Creating Music for CRES

Chances are you have already heard Network production music without even knowing it. You cannot switch on a radio or television without hearing Network themes on thousands of broadcast commercials, sports features, local and national television programs, news broadcasts, and documentaries. But now, their wonderful music will benefit CRES and the wildlife we are trying to save. A series of 16 compact discs and cassettes was just released featuring some fabulous photos from the San Diego Zoo on their covers. Titles such as "Tiger River" and "Gorilla Tropics" for adults feature distinctive New Age music and nature sounds. Children's titles such as "Wild Things" and "Rockin' Reptiles" are toe-tapping audio excursions that explore the wonder and diversity of Earth's animal kingdom, along with providing great lyrics and sing-along versions for the entire family. Bob Skomer, president of Network Music, is pleased that his company has the opportunity to participate in a project benefiting CRES: "We're very supportive of the organization and its work. We've tried to create music that not only reflects the exhibits at the Zoo and the Wild Animal Park but also uses the universal language of music to capture the essence of CRES so its efforts can be appreciated worldwide." The compact discs and cassettes are available at stores nationwide as well as in the Zoo gift shops. Distributed by Northword Press.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Spring Cleaning For CRES

Helping CRES through Cans for Critters may bring you face-to-face with a sea lion, like Jennifer Leidenberger of Warren-Walker School.

Ever wonder what's at the end of that ant trail leading to your garage? It's probably that sticky, forgotten bag of aluminum cans that has been waiting patiently for a ride to the recycling center!

If you need something to help motivate your recycling intentions, the San Diego Zoo has an exciting opportunity for you. Join the many schools, organizations, and households as they combine efforts to save and redeem aluminum cans and other recyclables for the Cans for Critters program.

For the last 15 years, Cans for Critters participants have raised thousands of dollars from aluminum cans—just like the ones in your garage—to benefit CRES, the Center for Reproduction of Endangered Species.

School programs run from February 26 through April 26 and include prizes, assemblies, and a party at the Zoo. Corporate organizations and individual households may participate year-round by redeeming their recyclables through select recycling centers, which forward the proceeds directly to CRES.

The best part of joining Cans for Critters is knowing that your conservation efforts will be helping to improve our environment and the future of endangered wildlife. To learn more about the Cans for Critters program or to locate a participating recycler, please call Kim Jordan in the Zoo's development department at (619) 685-3272.

Spring cleaning time is just around the corner—so why not say good-bye to that ant trail by donating that forgotten bag of cans and your other recyclables to CRES?

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